

giving rise to the strong wind shear which is essential in the formation of mountain waves.

On the assumption of increasing moisture in the middle layers as the air moved eastward and the strengthening of the inversion near the 10,000-foot level as indicated on the Pittsburgh sounding, along with the stronger wind speeds and wind shear as indicated on the Washington sounding, a computation of the wavelength of billow clouds using the equations developed by Haurwitz [3, 4] gives values of the wavelength of the correct order of magnitude, 2 to 3 miles. The wavelength observed on the RHI scope was approximately  $3\frac{1}{2}$  miles. In another report on a very prominent wave cloud system in this area by Colson and Lindsay [2], the wavelength was computed to be about 4 miles.

#### 5. CAPABILITIES OF THE WSR-57 RADAR

Much valuable information can be derived from the radar equipped with the RHI scope. Through its use a three-dimensional representation or interpretation of the radar echoes can be made. However, there are several factors which must be taken into account before definite quantitative measurements can be made. These include the characteristics of the particular radar set, the nature of the echoes, corrections for earth's curvature and beam width distortion. In making these corrections one must be sure that the targets are filling the radar beam and that the normal signal propagation is maintained. The problem of getting a representative picture of all of the targets at one time is difficult because if only the edge of a target is being scanned, it will appear noticeably smaller or weaker than other targets more completely in the beam. However, it was not felt worth while to make the detailed corrections in this case, since we are mainly interested in a qualitative interpretation of the radar picture.

Because of the vertical motions involved in the formation of wave clouds, these can support larger water droplets than ordinary altocumulus clouds and are better targets for the radar beam. The ability of radar to indicate the location and extent of wave phenomena could be a useful tool in aviation forecasting. Mountain waves present a serious hazard to small aircraft and also to larger aircraft whose operational requirements demand that flights be made at levels close to the terrain. In some cases, mountain waves generate severe turbulence and strong updrafts and downdrafts.

#### 6. CONCLUSIONS

The results of observations during the past years indicate that the mountain wave situations can be rather widespread and particularly frequent during the winter months east of the Appalachians. Further efforts will be made at Washington National Airport to obtain additional data of this nature to determine the possibilities of radar in the detection of wave clouds.

#### REFERENCES

1. D. Colson, "Meteorological Problems in Forecasting Mountain Waves," *Bulletin of the American Meteorological Society*, vol. 35, No. 8, Oct. 1954, pp. 363-371.
2. D. Colson and C. V. Lindsay, "Unusual Wave Cloud Over Washington, D.C.," *Monthly Weather Review*, vol. 87, No. 12, Dec. 1959, pp. 451-452.
3. B. Haurwitz, "Über die Wellenlänge von Luftwogen," *Beiträge zur Geophysik*, vol. 37, 1932, pp. 16-24.
4. B. Haurwitz, "Wogenwolken und Luftwogen," *Meteorologische Zeitschrift*, vol. 48, 1931, pp. 483-484.
5. R. S. Scorer, "Theory of Waves in the Lee of Mountains," *Quarterly Journal of the Royal Meteorological Society*, vol. 75, No. 374, Jan. 1949, pp. 41-56.

#### CORRECTION

*Monthly Weather Review*, vol. 88, Aug. 1960, pp. 290-291: In Section 4, Monthly Mean 700-mb. Circulation, the reference to the map of monthly mean circulation in line 2 should be to figure 7; the figure referred to in line 8 from the bottom of that column should be figure 6. P. 291, line 8, col. 1: reference should be to figure 7.